

MINUTES

**MINE SAFETY AND HEALTH RESEARCH ADVISORY COMMITTEE (MSHRAC) MEETING
AUGUST 20-21, 2012
HILTON GARDEN INN PITTSBURGH/SOUTHPOINTE
100 CORPORATE DRIVE
CANONSBURG, PA**

COMMITTEE MEMBERS & ATTENDEES PRESENT

Dr. Jeffery L. Kohler, Executive Secretary to MSHRAC, Associate Director for Mining and Director, Office for Mine Safety and Health Research (OMSHR), National Institute for Occupational Safety and Health (NIOSH), called the meeting to order. The following members were present:

Mr. Brent Chamberlain, Director of Human Resources, Safety and Health, Scorpio Gold Corp.
Mr. Dennis O'Dell, Administrator for Occupational Health and Safety, United Mine Workers of America
Mr. John P. Seiler, Chief, Physical Agents Branch, Mine Safety and Health Administration, attending as Dr. Jeffery Kravitz representative
Dr. Syd S. Peng, Professor, West Virginia University
Mr. Emmett Russell, Director, Department of Safety and Health, International Union of Operating Engineers
Mr. Michael Wright, Director of Health, Safety, and Environment, United Steelworkers of America
Dr. Cecile Rose, Associate Professor, Department of Medicine, University of Colorado
Dr. Samuel Frimpong, Professor and Chair, Mining and Nuclear Engineering, Missouri Science and Technology
Anthony S. Bumbico, Vice-President of Safety, Arch Coal Co.
Kelly F. Bailey, Director, Safety, Health and Environmental Services, Vulcan Materials Co.
Richard J. Fragaszy, Program Director, Division of Civil, Mechanical and Manufacturing Innovation, National Science Foundation
Derek Elsworth, Professor, Department of Energy and Mineral Engineering, Pennsylvania State University

The following attendees were also present:

Adam Smith, NIOSH, Pittsburgh, PA
Amia Downes, NIOSH, Atlanta, GA
Andrew Cecala, NIOSH, Pittsburgh, PA
Andrew Perkins, Vulcan Materials Co., Birmingham, AL
Robert H. Peters, NIOSH, Pittsburgh, PA
Carin Kosmoski, NIOSH, Pittsburgh, PA
Chad McDongal, Vulcan Materials Co., Birmingham, AL
Dana R. Willmer, NIOSH, Pittsburgh, PA
David K. Ingram, NIOSH, Pittsburgh, PA
David P. Snyder, NIOSH, Pittsburgh, PA
Drew Potts, NIOSH, Pittsburgh, PA
Eric S. Weiss, NIOSH, Pittsburgh, PA
Floyd D. Varley, Yukon Zinc Corp., Vancouver, B.C.
Gerrit Goodman, NIOSH, Pittsburgh, PA
Jim Sharpe, Sharpe Media, LLC, Arlington, VA
Joseph A. Waynert, NIOSH, Pittsburgh, PA
Joel Haight, NIOSH, Pittsburgh, PA
John J. Sammarco, NIOSH, Pittsburgh, PA
Joseph A. Sbaffoni, PaDEP Bureau of Mine Safety, Uniontown, PA
Lewis V. Wade, Washington, D.C.
Linda McWilliams, NIOSH, Pittsburgh, PA
Marcia L. Harris, NIOSH, Pittsburgh, PA
Marie Chovanec, NIOSH, Pittsburgh, PA
Mark Ellis, IMA-NA, Washington, D.C.
Marlene D. Ackman, NIOSH, Pittsburgh, PA
Maryann D'Alessandro, NIOSH, Pittsburgh, PA
Michael J. Sapko, NIOSH, Pittsburgh, PA
Pete G. Kovalchik, NIOSH, Pittsburgh, PA

R.J. Matetic, NIOSH, Pittsburgh, PA
Richard Wood, IUOE, Washington, D.C.
Rohan Fernando, NIOSH, Pittsburgh, PA
Stephen P. Signer, NIOSH, Spokane, WA
Susan M. Moore, NIOSH, Pittsburgh, PA
Thomas M. Barczak, NIOSH, Pittsburgh, PA

Dr. Kohler explained that MSHRAC members participating in the meeting must be free from conflicts of interest. He asked members to declare conflicts of interest each day prior to the start of the meeting. There were no conflicts from members reported.

Dr. Rose read the Minutes from the last meeting and they were approved unanimously.

DR. LEWIS V. WADE on behalf of DR. JOHN HOWARD, REPORT FROM THE DIRECTOR, NIOSH

-Regards from Dr. Howard and Diane Porter

-Both Dr. Howard and Ms. Porter wanted MSHRAC to know that they hold the Mining Program in the highest regard.

-Attributes of the Mining program that are held up as models for the rest of NIOSH:

- strength of the technical program
- focus on measurable, impact related goals
- quality of leadership
- stakeholder involvement

-Both NIOSH and Mining Program budgets flat in recent years and projected to be flat into FY2013, this is an accomplishment for any federal program during these difficult years.

-Energy Employees Occupational Illness and Compensation Program highlights:

- 30,000 individual dose reconstructions completed
- 20 plus Special Exposure Cohorts granted
- More than \$1 billion in compensation payments made to workers

-World Trade Center Health Program highlights:

- 63,000 members enrolled in the program, 57,000 responders and 6,000 survivors
- a number of cancers in the process of being added to the list of covered conditions

DR. JEFFERY L. KOHLER, REPORT FROM THE ASSOCIATE DIRECTOR FOR MINING SAFETY AND HEALTH, NIOSH

Dr. Kohler provided an overview of the meeting and the goals for the Committee. The meeting included informational updates and responses to inquiries from the last meeting, detailed updates on specific topics, a request for feedback and Committee deliberations and recommendations on NIOSH OMSHR research.

Overall, the NIOSH Mining Program continues to be well-aligned with the most compelling programmatic needs defined by surveillance data and stakeholder inputs. Research-to-practice remains strong. Research program highlights were presented regarding relevance and impact for reducing noise through engineering controls; reducing injuries through improved illumination; and, reducing silica exposure through engineering controls and other interventions. Updates and proposed direction were presented for reducing coal dust exposures through multiple interventions and improving safety and health through non-traditional (in mining) approaches. Technical

briefs were presented regarding a demographic survey, communications and tracking, oxygen supply partnership, and coal dust explosions. MINER Action Innovations and Adaptations were discussed.

A progress update was presented on OMSHR's implementation of the NAS recommendations--MSHRAC had previously approved the implementation plan. OMSHR developed and implemented specific activities to fulfill the approved implementation actions. A scoring exercise utilizing the OMB-approved scoring methodology for each of the fulfilled recommendations was presented.

Dr. Kohler provided an overview of budget and staffing. While budget is adequate to address the most important mining safety and health needs and imperatives, staffing remains a challenge. Staff attrition continues to erode core competencies and adversely impact the staffing of projects and key OMSHR positions. Despite a continuing global recruitment effort, success in recruiting has been very limited. Facility issues, both at Lake Lynn and the Pittsburgh campus, are having a negative impact on the program. Government imposed travel ceilings, hiring restrictions, and procurement deadlines have had, and will continue to have, an adverse impact on the OMSHR mission.

Dr. Kohler ended with an overview of capacity building initiatives in the areas of ventilation engineering and ground control engineering concluding with a question that he often poses to OMSHR staff which encompasses the OMSHR mission, "What have you done, today, to improve mineworker safety and health?"

During discussions which followed, the MSHRAC Committee was asked and committed to provide feedback on relevance and impact and other observations as warranted regarding: 1) Research Program Highlights and the Technical Briefings which were presented; 2) Completed research projects, projects in-process, and the proposed direction of projects; 3) Provide assistance to OMSHR in finding research partners and sites in which to carryout research and testing in support of research; and 4) Conduct a scoring exercise utilizing the OMB-approved scoring methodology for each of the fulfilled NAS recommendations which was presented. (This scoring exercise is addressed separately in the Minutes).

DR. JAMES THOMPSON, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. James K. Thompson provided an overview of the status of the development of engineering noise controls and interventions related to hearing loss prevention. He provided a status report on each the noise control initiatives for noise reduction.

Dr. Thompson described the dual sprocket and coated continuous mining machine (CMM) chains developed with Joy to reduce noise exposure for CMM operators. He noted that the dual sprocket chain has been commercially available since 2011 and is fitted on 30% of the CMMs in the US. The coated chain has been available for purchase from Joy since June of this year and provides even greater noise reduction.

Next, Dr. Thompson described the controls for roof bolting machines. The bit isolator has been commercially available since July of 2011 and has become very popular with miners. It provides up to 6 dB of reduction in operator noise exposure. The device was developed with the cooperation of Kennametal and is available through their distribution channels. A future control for roof bolting machines is the collapsible drill steel enclosure (CDSE).

For longwall mining systems, a major project is underway combining experimental and advanced modeling techniques to reduce longwall system noise. Dr. Thompson described the program and noted that it is also developing technologies that will allow even greater strides for noise controls of the future. As part of this program the project team has developed a unique transducer to measure longwall drum bit forces for the first time. This capability will have benefits to many aspects of longwall system development.

Dr. Thompson also described the work in metal/nonmetal mines to reduce the noise emissions from haul trucks and load haul dumps (LHD). Innovative studies have determined the primary noise source to be the engine cooling fans. A unique test stand has been developed to test such fans under realistic conditions to develop quieter solutions.

Work is underway to reduce the noise from air carbon arc cutting and gouging. Some promising discoveries indicate that there may be refines which can lead to significant noise reductions for the operators of these units.

Finally, Dr. Thompson reviewed the hearing loss interventions programs including the Hearing Loss Simulator, the QuickFit device, and other information and training activities. He noted that OMSHR has had several successes in commercializing effective noise controls and that there is more to come in the next few years.

MR. DREW POTTS, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Mr. Potts gave a presentation on a research imperative to reduce coal dust exposures. He talked about a three prong strategy developed and initiated in 2008 by the Dust, Ventilation and Toxic Substances Branch of OMSHR to enable mines to comply with an MSHA proposed reduction in the coal mine dust standard from 2 to 1 mg/m³. The three prongs of the strategy include increased worker empowerment through the promotion of the Personal Dust Monitor (PDM), a heightened education and technology transfer program as well as the execution of a research and development plan to innovate, evaluate or refine dust control technology to further reduce occupational exposures. Targeted occupations for control technology include the roof bolting machine operator, continuous miner operator, shearer operator, longwall return jacksetter and surface blasthole drill operator. Information was presented concerning the development, testing and certification of the PDM device and how feedback from the device would result in positive workplace changes, reducing personal dust exposure. The education and technology transfer activities included the publishing of a handbook in 2010 containing the best practices for dust control in coal mining followed by a series of related workshops conducted for mining professionals and workers across the country. Mr. Potts also reviewed past (since 2008), present and future research activities to reduce dust exposures at the targeted occupations. Current research activities include: design of a shearer-mounted tailgate spray manifold used to maintain a fresh split of air in the longwall walkway, use of re-directed scrubber airflow to prevent dust rollback on continuous miner faces, evaluation of a standalone dust collector used to create a fresh split of air for bolting operations and a bolting machine drill bit sleeve for improved dust capture. Recently completed projects included: a longwall mining benchmarking study, optimization of external sprays on a continuous mining machine using a scrubber and exhausting face ventilation, an evaluation of continuous miner wet-head technology, design of a canopy air curtain to reduce roof bolter operator dust exposures, evaluation of a bolting machine water box used to capture dust escaping the dust collection system and design of an air blocking shelf to improve dust capture on blasthole drills. Future projects will focus on the development of a shearer mounted scrubber, an optimized longwall shield water spray configuration, longwall foam applications, optimized water spray quantities on continuous miner machines and standard operating procedures and techniques for improved dust control when cutting cross-cut entries. Finally, Mr. Potts presented the results of a policy-related project comparing face dust levels when using a continuous miner water-powered scrubber to levels when not using a scrubber.

DR. JOHN SAMMARCO, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. John Sammarco presented a summary of NIOSH illumination research to improve miner safety. Illumination plays such a critical role in coal and metal/nonmetal mines because miners depend most heavily on visual cues to detect potential hazards associated with falls of ground, slips/trips/falls (STFs), and powered haulage. NIOSH mine illumination research has focused on the cap lamp that is often a miner's most important source of light. NIOSH researchers developed a light-emitting diode (LED) cap lamp that provides better illumination of mine hazards compared to other LED cap lamps, and a Visual Warning System (VWS) intended to reduce struck-by and pinning accidents. Test results for the VWS indicate a 71% improvement in detecting machine movement hazards. The MSHA-approved NIOSH LED cap lamp was recognized by the 2011 HHS Innovates Award and the 2011 Bullard-Sherwood Research-to-Practice Award. Test results indicated 94% better trip hazard detection, 79% better peripheral motion detection that is needed to detect machine pinning/striking hazards, and no increase in discomfort glare. Most recently, field testing was conducted to measure head tilt while walking with the NIOSH cap lamp and a commercial cap lamp. Results indicate up to 6 degrees less in head tilt towards the floor with the NIOSH cap lamp thus indicating better illumination of the floor and better miner awareness of hazards in front of them. Improved lighting may also reduce the impact of postural balance that is a contributing factor for STFs. A comparative evaluation of postural balance while using various cap lamps was conducted in the low-level light conditions of a mine and the high-level light conditions of a laboratory. The results indicated that balance significantly declined in an underground coal mine compared to the laboratory testing condition. Next, research was conducted to determine if lighting could be used to improve miner escape and rescue in smoke. Colored, retro-reflective targets are used to mark primary and secondary escape ways in mines. The target detection distance in smoke was measured given the variables of three types of cap lamps, three colors of laser pointer, light, and three colors of visual targets. Results indicated that green targets were the most visible, the green laser light was better than the red or blue laser light, and that cap lamps were better than laser pointers for detecting the targets. Lastly, the latest research was presented concerning the development of an LED cap lamp for the visual environment of metal/nonmetal miners which differs vastly from that of coal mines.

DR. SUSAN MOORE and MS. LINDA McWILLIAMS, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Moore and Ms. McWilliams presented an overview of the National Survey of the Mining Population, a probability-based sample survey, conducted by NIOSH, of U.S. mining operations and their employees. Randomly selected mining operations in each of the five major mining sectors (coal, metal, nonmetal, stone, and sand and gravel) received the survey. A total of 737 mining operations returned completed questionnaires and reported data for 9,008 employees.

Ms. McWilliams discussed the specific aims, expected outcomes, and the survey methodology. She then presented the results for the sampled mines, with respect to completing and returning the questionnaire. A graph was displayed which showed the weighted response rates by sector and mine type. The highest response rate was in the underground nonmetal industry (55.5%), with the lowest response rate in surface coal (25.3%). The challenges of coding the hand-written employee jobs titles for more than 9,000 mine operator employees were presented. Ms. McWilliams then proceeded to present tables showing samples of national estimates and associated 95% confidence intervals for selected demographic and occupational characteristics of employees and mines.

Dr. Moore then presented and discussed comparisons of national estimates for employees among U.S. mining operations. Bar charts showing comparisons such as age, educational level, and mining experience were reported by mining sector. She went on to discuss comparisons of national estimates among U.S. mines for average number of hours worked per week, percentage of mines with rotating shifts, percentage of mines reporting independent contractors, and percentage of mines with their own rescue teams. In conclusion, Dr. Moore discussed future work using the survey data. Denominator data will be used to calculate injury rates for various demographic and occupational groups. Other types of statistical modeling will also be investigated.

DR. JOSEPH WAYNERT, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Waynert began the Communications and Tracking (CT) update with a brief discussion of the MINER Act requirements guide the CT research direction. The MINER Act assumes that disasters will happen and aims to address how miners and mine owners can best prepare to respond to those disasters. The clear intent of the Act and the greatest benefit to miners is for the CT systems to remain operational (be survivable) following a disaster. The MINER Act, combined with MSHA Program Policy Letters (PPLs) requires mines to install wireless communications and electronic tracking systems to provide coverage in the primary and secondary escape ways and around critical areas where miners are likely to be working. Since passage of the MINER Act, NIOSH has awarded 43 contracts valued at close to \$24 million to develop and commercialize CT equipment that meets the MINER Act requirements. NIOSH also awarded several study contracts to investigate various knowledge gaps that had been identified, organized two major workshops and published an extensive tutorial, intended to inform stakeholders of the various CT technologies available and their operating principals.

At this time, all underground coal mines in the U.S. have some form of CT equipment installed. The MINER Act also requires communication systems to be 'redundant' and available, and tracking systems to 'remain serviceable' post-accident. However, the tools to assess the performance of CT systems, to identify and analyze the impact of potential single point failures, to assess the impact of various types of disasters, and to determine the reliability and survivability of a system relative to a potential incident do not exist. A critically important gap in the development of such tools is being addressed by the radio signal propagation research being done at NIOSH to understand the range limitations and coupling characteristics of radio signals underground which is a critical missing piece in understanding CT system behavior pre- and post-accident. This research will provide much needed information that can be used to help optimize the performance of CT systems as these systems become taxed with steadily increasing information transport from various gas and air flow sensors, proximity data, and possibly video and miner health status in the future.

Dr. Waynert described the various technologies that are commercially available. He discussed how mines are currently achieving redundancy by installing systems in the primary and secondary escape ways which may be separated by only a few hundred feet, making them susceptible to failure from disasters that likely exceed those dimensions. He also described the need for the definition of CT survivability and a quantitative metric for survivability evaluation. Due to the differences between large and small mines; the use of continuous miners or long wall equipment; the choices of CT technologies and the configuration in which they can be installed; the type, extent, and location of a possible disasters; and the relative location of the miners; it is necessary to analyze the survivability of CT systems with computer modeling tools. Dr. Waynert proposed that NIOSH should develop

modeling tools for mine owners, system integrators, and regulators, which can objectively and quantitatively evaluate the survivability of possible CT installations for a specific mine.

DR. THOMAS BARCZAK, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Barczak presented the work conducted at the DMST on Breathable Air Supplies (BAS) used in underground mining. Recent mining disasters have highlighted deficiencies in breathing air technologies for mine escape. DMST has undertaken the task of identifying and exploring technologies towards developing the next generation of breathing air supplies for underground mining. Considerations for this development are, establishing practical and achievable design goals, understanding and addressing policy implications, embracing paradigm shifts when needed, recognizing and accounting for timeline drivers. Although this is a research and development effort, planning for commercial development and training considerations is also within the scope of this effort.

A partnership between key stakeholders NIOSH, MSHA, UMWA, NMA and BCOA was established in the summer of 2011 to receive input from their respective views on the path to achieving the goals. A strategic plan was developed and the vision for developing the next generation of BAS was presented to this partnership in Feb 2012 resulting in concurrence on proceeding with the plan.

Breathable Air Supplies in mining refers to a range of devices and systems that offer respiratory protection to underground miners in the event of an emergency and include escape, rescue and refuge technology. This presentation covered Mine Escape devices and systems as this was the focus area where technological advances were most required. Fundamental requirements for escape BAS are that they must be readily available, simple to use and be of sufficient capacity to escape from the mine. Escape from most mines cannot be done using a single breathing device; therefore the escape must be executed using a system with different BAS technology and methodology. Immediate response at the inby area and response once in the outby area has been identified as the two components to breathable air for mine escape. Therefore different technologies that allow a continued escape with seamless transfer from one device to another are part of this development bearing in mind some of the limitations of BAS applied in escape. The escape devices development is being addressed at sub-component level focusing on critical areas such as the hood/mask, docking valve and high pressure cylinders.

The rules and regulations governing mine escape are being taken into consideration when developing the next generation of BAS with the primary goal to minimize the exposure of the user to bad mine air. Next generation escape breathing devices need to be ergonomically designed to mitigate the act of removing the unit and leaving it close by as allowed by the current regulations. A new performance rule for escape closed circuit breathing apparatus that went into effect in April this year also challenges apparatus to be efficiently designed.

Multifaceted contract program is currently underway to assist with achieving the next generation of BAS. Experts in breathing systems design such as the Navy Experimental Diving Unit, Naval Surface Warfare Center and NASA Biomedical Laboratories have been engaged through Inter-Agency Agreements. Sub-component design is affected through contracts to industry.

DR. MARYANN D'ALESSANDRO, NATIONAL PERSONAL PROTECTIVE TECHNOLOGY LABORATORY, NIOSH

Dr. D'Alessandro presented a summary on the National Personal Protective Technology Laboratory (NPPTL). NPPTL and the PPT Program work closely with OMSHR in an effort to align our activities that support the mining sector with the PPT Program and Mining Program Goals. Our mining focus within the PPT Program has been the research, standards development, and certification of self-contained self-rescuers used to save the lives of miners when they need to escape from a fire or explosion.

NPPTL issued a report in March on the evaluation of the CSE SR100 SCSRs. As part of a routine field testing program of SCSRs used in coal mines, NIOSH and MSHA detected two SR-100s that lacked sufficient start-up oxygen. CSE Corporation, the manufacturer of the respirator, subsequently discovered one SCSR that lacked sufficient start-up oxygen in that company's internal quality control program and voluntarily stopped further production and sales of SR-100s. The impact of the problem is that if a miner or other user attempts to use one of these respirators to escape a harmful environment, and this problem presents itself, escape will be delayed. The escape will likely be delayed because the user will have to locate and put on another unit prior to escape. The outcome of the report is a need to replace the units from underground mines by December 30, 2013. The report may be downloaded from http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/cse.html.

On Mar 8, 2012, NIOSH published the final rule on CCER, which became effective April 9, 2012. NIOSH hopes that the new regulation will provide improved devices to keep miners safe. Some key changes to the regulation include:

- Classify as capacity rather than duration. In the previous regulation, a unit was classified as a 60 min, 30 min or 10 min unit for example. This is misleading because the capacity is dependent on the work rate. The new regulation replaces the measurement of the duration of breathing gas supplied with the measurement of the volume of breathing gas supplied (in liters of oxygen) as a principal certification parameter.
 - o CAP 1, 2,3 – One important issue to note is that it will be very important to educate the users on these changes, once these units become available using this new classification
- Establish performance-based testing requirements for durability since CCERs are often used in relatively harsh environmental and handling conditions, such as in coal mining. These tests were not conducted on devices approved to date.
- Provide for the approval of new "dockable" CCER designs that would allow the user to replenish the breathing gas supply of the CCER safely, reliably, and quickly under escape conditions.
- Require manufacturers to provide instructions for registering CCERs in the packaging. Our initial procedure is to have email sent to us, and we will manually create a database. An email registration process is available. We are working with MSHA to leverage the MSHA inventory for this requirement. We also hope the registration process will assist us in notifying purchasers when a problem associated with a CCER model is identified since presently we have limited ability to locate CCER models. We would like ideas regarding how we could get the word out regarding the availability of the CCER Registration website?
- Six years after effective date (April 9, 2018) units approved prior to new CCER standard must be removed from service, are no longer approved.

May 2012: FRN Published Announcing the Opportunity for Manufacturers and Designers of CCERs to Participate in Performance Testing within a Correlation Test Program offered by NIOSH. The Correlation Testing Program will consist of two tests:

- Performance Tests of As-Received and Environmentally Treated Closed-Circuit Respirators;
- Capacity Tests of As-Received and Environmentally Treated Closed-Circuit Escape Respirators

Three manufacturers are participating in the program. Another manufacturer is interested in submitting a product for approval but has not participated in the correlation program.

Future escape respirators:

- NPPTL fully supports and will make every effort to update the regulations to push the limits of the technology based on the research underway to develop the next generation respiratory protective devices for underground miners.
- NIOSH is heavily involved in developing ISO respiratory standards and is currently conducting a comparative assessment of 42 CFR and the new ISO standards to determine if it will be possible to incorporate any of the ISO standards by reference as we move forward with updates to the federal regulations.

DR. CARIN KOZMOSKI, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Kosmoski presented information about the NIOSH funded project, "Assessing the Safety Culture of Underground Coal Mining." This project began in October 2008 and will conclude at the end of September 2012. Dr. Kosmoski described the multiple methods that NIOSH utilized to conduct safety culture assessments, including functional analysis, an organizational and safety culture questionnaire, in-depth interviews, behavioral anchored rating scales, and behavioral observations. The sample of five underground coal mines participating in these assessments included one small, two medium, and two large mines; two Northern Appalachian, one Central Appalachian, one Southern Appalachian, and one Western mine; one union affiliated mine and four non-union mines. A total of 274 interviews were conducted, 1,096 behavioral anchored rating scales were completed, and 1,356 organizational and safety culture questionnaires were administered. Dr. Kosmoski presented some of the preliminary results from the five assessments and discussed the benefits of this project to the participating mines as well as the potential benefits to the underground coal mining industry. The presentation concluded with a discussion of future work in this area including the intention to disseminate a safety culture assessment toolkit and plans to conduct additional safety culture assessments to improve representation of union affiliated mines, small mines, and mines from the Midwestern area in the sample.

DR. DANA REINKE WILLMER, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Willmer provided an overview of NIOSH's research on occupational health and safety management systems in the U.S. mining industry. With increased frequency, organizations worldwide have integrated occupational health and safety management systems (HSMS) into their broader systems of organizational management. As Dr. Willmer noted the use of a management systems approach for mining health and safety has become a priority topic of interest for mining regulators, mining companies and industry representatives. Dr. Willmer described NIOSH's exploratory study to identify how mining companies manage their specific company's health and safety practices. Using scientific research identifying indicators of effective HSMS to theoretically frame the study, Dr. Willmer described qualitative insight gained from data collected at six mines of varied commodities across the U.S. Dr. Willmer closed her presentation explaining the next research steps as NIOSH starts a full scale research project on this topic. Those next steps include : identifying unique characteristics of U.S. mining HSMS elements and practices and determining how to quantify in day to day mining operations for measurement and tracking; comparing U.S. mining HSMS approaches to international examples; Developing analytical model to evaluate interactive effects and how they influence and impact mining injury and incident rates and using that model to identify predictive rates of interactive effects of organizational resources allocation with incident rate variables in order to provide the industry guidance on building cost-effective HSMS.

DR. GERRIT GOODMAN, MR. MICHAEL SAPKO, and MS. MARCIA HARRIS, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Dr. Goodman presented an overview of coal dust explosions and an anatomy of a propagating explosion. He reviewed the recent trend in coal mine explosions and emphasized the importance of rock dust in preventing propagating coal dust explosions. Mrs. Harris spoke about the coal dust explosibility meter (CDEM). She gave an overview of the CDEM's operation and summarized the 97% correlation between CDEM results with low temperature ashing (LTA) results from the recently approved NIOSH Information Circular (IC) 9529 "Coal Dust Explosibility Meter Evaluation and Recommendations for Application." Mrs. Harris also spoke about factors which impact mine dust explosibility assessments which include the current method of mine dust sample collection, the particle size of the dust within the sample, and the ability of the rock dust to disperse. The explosibility assessment (either LTA or CDEM) is only as good as the sample that is analyzed. The method by which the mine dust sample is collected can greatly influence the results and determination of explosibility including the particle size. As coal dust particles become finer, the explosibility hazard increases. Finer rock dust particles are better for inerting. Rock dust that does not contain at least 70% minus 200 mesh is not effective in inerting a propagating coal dust explosion and rock dust must be able to be dispersed in order to be effective. Mr. Sapko then discussed the issue of dispersibility and rock dust caking. He spoke about the contributing factors to caking, the relevant definition of "light blast of air", and qualitative and quantitative methods to evaluate caking properties. OMSHR determined that the standard proctor test (ASTM D 698) and the unconfined compression test (ASTM D 2166) could indicate the strength of a cake and the tendency for a rock to cake when wetted then dried. To qualitatively assess a rock dust for caking, the rock dust can simply be wetted, dried, and checked for caking. To quantitatively assess a rock dust, the rock dust can be evaluated within the OMSHR-developed dust dispersion chamber where a pulse of air of known pressure and duration is applied to each rock dust sample and the mass loss of the dust within the tray is then measured. The dust dispersion chamber results have shown that rock dusts treated with additives are up to 4 times more dispersible than untreated rock dusts. Mr. Sapko also discussed respirable dust concerns and the initiative for wet/foamed rock dusting.

MR. ANDREW CECALA, OFFICE OF MINE SAFETY AND HEALTH RESEARCH, NIOSH

Mr. Cecala presented an overview of interventions developed by NIOSH to reduce silica exposures in the metal/nonmetal mining, processing, and materials handlings industries. This presentation was broken down into past research interventions and current research tasks to reduce miners' exposure to silica and other respirable dusts. The six past research interventions discussed were the dual-nozzle bagging system, the overhead air supply island system (OASIS), the bag and belt cleaning device (B&BCD), the pallet loading dust control system, the clothes cleaning device, and the total structure ventilation design. This was not an all-inclusive list of past interventions but provided a few examples of the types of engineering controls that have been developed over the years to reduce workers' exposure to silica and other respirable dusts. The second part of the presentation discussed current research focuses and addressed the following areas: filtration and pressurization systems to reduce dust in enclosed cabs on mobile mining equipment, the dust control handbook, the Helmet-CAM and EVADE software development, reducing workers' exposures in operator compartments and control rooms, and reducing exposures during screen cleaning and changing. It was stated by Mr. Cecala that through these metal/nonmetal dust research efforts over the years, the focus was, and continues to be, on improving the health of our nation's miners by reducing their exposure to silica and other types of respirable dusts.

Dr. Kohler presented an overview of OMSHR's progress regarding the recommendations received from the National Academy of Sciences Review of the Mining Program. The MSHRAC discussed OMSHR's progress and scored each Recommendation accordingly. The attached file, 'MSHRAC-NAS-OMSHR Program Scoring,' documents the scoring exercise.

FINDINGS AND RECOMMENDATIONS BY MSHRAC MEMBERS

There was general discussion of the issues among the members following each of the presentations. Specific findings, recommendations, comments, and requests include:

-The Committee agreed to prepare a written letter to the Secretary, Health and Human Services, related to the Lake Lynn Laboratory as the Laboratory is critical and should not be closed. Letter attached.

-A member asked if OMSHR had collaborations in the stone, sand, and gravel industry and offered to provide suggestions for possible partners if needed. OMSHR responded with a description of partners.

-A member asked about the NIOSH nanoparticle study. Dr. Kohler explained that OMSHR did not have the lead on this topic but would arrange for an overview to be presented at the next MSHRAC meeting.

-A member asked if OMSHR had any contact/partnership with the Navy. Dr. Barczak explained the interactions and agreements established with the Navy to utilize/study naval technology which could be applicable to mining.

-A member asked if manufacturers were embracing engineering noise controls. Dr. Thompson responded positively giving examples of partnerships.

-A member asked where OMSHR was in terms of deploying the PDM (Personal Dust Monitor). Mr. Potts explained the PDM is available commercially; however, mines are not required to use them. There is no MSHA regulation requiring its use.

-A member asked about the 1 milligram initiative. Dr. Kohler explained this project was part of the Division of Respiratory Disease Studies (DRDS) and would ask them to present an overview at the next MSHRAC meeting.

-A member suggested it would be useful to separate underground information from surface information in relation to the Demographic Study of the Mining Industry.

In Closing, MSHRAC members discussed the degree to which: 1) the mine research activities of NIOSH conform to standards of scientific excellence appropriate to Federal scientific institutions in accomplishing objectives in mine safety and health; 2) the mine research activities, alone or in conjunction with other known activities inside and outside of NIOSH, address currently relevant needs in the field of mine safety and health; and 3) MSHRAC's commitment to finding viable partners for OMSHR as needed; and 4) the research activities produce intended results in addressing important research questions in mine safety and health, both in terms of applicability of the research findings and translations of findings for industry and workers.

The Committee stated their conclusions that the research conducted by the NIOSH Office of Mine Safety and Health Research (OMSHR) conforms to high scientific standards, is relevant and focused on high priority problems, and is transferring useful solutions to mineworkers. Moreover, they stated that OMSHR has established strong partnerships and collaborations with labor, industry, and academia, and the partnerships are quite effective to expedite the diffusion of NIOSH research into practice.

AGENDA FOR FUTURE MEETING:

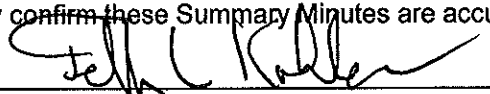
- OMSHR will present an Epidemiological evaluation
- OMSHR will present a progress report regarding Enhanced Communication with Mineworkers
- OMSHR will present a Summary of the Small Mines Initiative
- DRDS update
- NPPTL update
- Demographics Survey Plan for Moving Forward
- Continued scoring relative to OMSHR's performance as a result of the NAS Recommendations

ATTACHMENTS

MSHRAC Score Sheet.pdf MSHRACletter(3).pdf
-NAS-OMSHR Program

The meeting was adjourned.

I hereby confirm these Summary Minutes are accurate to the best of my knowledge.



Jeffery L. Kohler, PhD, MSHRAC Executive Secretary,
NIOSH Associate Director for Mining; and,
Director, Office of Mine Safety and Health Research

10/22/2012

Date